

We claim:

1. An interventional catheter assembly comprising:
 - a. an operating head coupled to a drive shaft and a drive assembly for rotation and having ports communicating with a sealed lumen;
 - b. a catheter system forming the sealed lumen mounted for axial translation at a proximal end with a control pod and communicating at a distal end with the operating head; and
 - c. a control pod housing operational components for advancing the catheter system and selectably rotating the operating head.
2. An interventional catheter assembly of claim 1, additionally comprising an operating head drive motor coupled to the drive shaft, wherein the drive motor comprises a variable speed drive motor that delivers a constant voltage for any specified rotational output.
3. An interventional catheter assembly of claim 2, wherein the current delivered to the drive motor is adjusted, under load conditions, if the voltage for any specified rotational output is insufficient to produce the specified rotational output under load conditions.
4. An interventional catheter assembly of claim 1, additionally comprising an operating head drive motor coupled to the drive shaft, wherein the drive motor employs a cascaded variable regulator voltage source.
5. An interventional catheter assembly of claim 1, wherein the control pod incorporates selectable operator adjustment features allowing an operator to increase and decrease rotational speed delivered to the drive shaft.
6. An interventional catheter assembly of claim 1, additionally comprising a torque selection feature providing preselected torque levels delivered by the drive assembly to the drive shaft.
7. An interventional catheter assembly of claim 6, wherein the torque selection feature incorporates an override setting for each selectable torque level, whereby the drive assembly is inactivated when a preselected torque level is exceeded.
8. An interventional catheter assembly of claim 1, wherein the catheter system has at least one section wherein a coil is provided in proximity to and along a common axis with a flexible sealed catheter and contacts but is not bonded to the catheter, whereby the flexible sealed catheter and coil combination provide a kink-free catheter section.

9. An interventional catheter assembly of claim 1, additionally having an aspiration motor comprising a multi-lobed vacuum pump that provides a consistent, high level of aspiration during operation of the interventional catheter assembly.
10. An interventional catheter assembly of claim 1, additionally having an aspiration system comprising a plurality of vacuum pumps connected in series.
11. An interventional catheter assembly of claim 1, wherein the control pod houses a drive motor coupled to the drive shaft by means of an arrangement of sliding tubes that rotate with respect to one another by balls held in slots formed in the tubes.
12. An interventional catheter assembly of claim 1, wherein the control pod incorporates a fluid seal assembly providing migration of fluid to a space formed between the drive shaft and a sealing member to prevent ingress of gas to the catheter system.
13. An interventional catheter assembly of claim 1, wherein the control pod incorporates a speed adjustment selection switch controlling rotational speed transmitted to the drive shaft.
14. An interventional catheter assembly of claim 1, wherein the operating head is adjustable between at least two operating conditions and the control pod incorporates a selection switch allowing an operator to select among operation head parameters.
15. An interventional catheter assembly of claim 14, wherein the selection switch allows an operator to select an operating head diameter.
16. An interventional catheter assembly of claim 1, wherein the operating head, catheter system and control pod are provided as a sterile, disposable kit.
17. An interventional catheter assembly of claim 16, additionally comprising a fluid receptacle in fluid communication with the catheter system.
18. An interventional catheter assembly of claim 1, wherein the control pod houses a drive motor operably coupled to the drive shaft and the drive motor is coupled to a sliding actuator mounted on the catheter system such that the drive motor is actuated when the sliding actuator grips the catheter system and advances it.
19. An interventional catheter assembly of claim 1, wherein the control pod incorporates a guidewire brake operable to clamp a guidewire in a stationary position when engaged and to allow translation of the guidewire through the brake when released.

20. An interventional catheter assembly of claim 19, additionally comprising a guidewire brake control system interrupt that prevents the drive system from being actuated when the guidewire brake is in a release position.
21. An interventional catheter assembly of claim 19, additionally comprising a guidewire brake selectable interrupt override control that, when actuated, permits an operator to selectably permit operation of the drive system when the guidewire brake is in a release position.
22. An interventional catheter assembly of claim 1, additionally comprising a slip seal adaptor mounted for axial translation on the catheter system having an adaptor insertion end that fits in an opening of an entry system connector port and a seal section having an inner diameter closely matching the outer diameter of the catheter system and slidable over the catheter system.
23. An interventional catheter assembly of claim 1, additionally comprising an extendable, telescoping guidewire support mounted in the control pod.
24. An interventional catheter assembly of claim 1, additionally comprising a console unit incorporating system control and display features and a motor providing vacuum for aspiration to the catheter assembly.
25. An interventional catheter assembly of claim 24, wherein the motor comprises a multi-lobed vacuum pump that provides consistent, high levels of aspiration during operation of the interventional catheter assembly.
26. An interventional catheter assembly of claim 24, wherein the motor comprises a plurality of vacuum pumps connected in series to provide constant, high levels of aspiration during operation of the interventional catheter assembly.
27. An interventional catheter assembly of claim 24, wherein the console unit is in electrical communication with the control pod and provides power to the drive system.
28. An interventional catheter assembly of claim 24, wherein the console unit displays output operational information including at least three of operating head rotation rate, operating head advance rate, aspiration rate, elapsed time of operation, aspiration volume, and fluid flow rate at the target site.